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6. AUTHOR(S) DR. DAVID C FRITTS					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) University of Alaska Geophysical Institute 903 Koyukyk Avenue, North Fairbanks AK 99775-0800				8. PERFORMING ORGANIZATION REPORT NUMBER 0947	
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13. ABSTRACT (Maximum 200 words) <p>During the first year, we have progressed in both areas defined for study in the original proposal. Collaboration with Dr. Oeyvind Andreassen of the Norwegian Defense Research Establishment (NDRE) initiated a numerical modeling effort which is now providing high-resolution 2-D simulations of compressible nonlinear gravity wave dynamics using a state-of-the-art pseudo-spectral code. We believe these results to be a substantial improvement over previous efforts to address the fundamentals of gravity wave breaking, spectral evolution, and momentum and energy transports in the middle atmosphere.</p>					
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DEPARTMENT OF THE AIR FORCE
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH (AFSC)
BOLLING AIR FORCE BASE, DC 20332-6448

DATE 3 Oct 91

MEMORANDUM FOR: PKZ

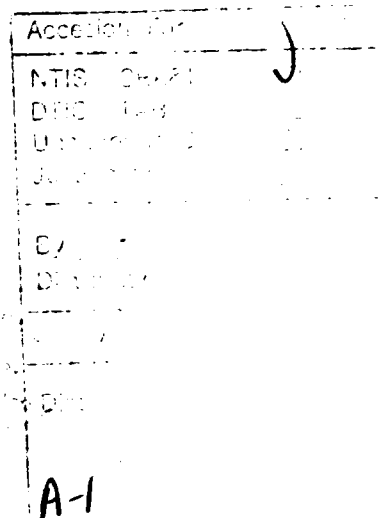
Dr Fritts is moving from
U of Alaska to U of Colorado. He
has submitted a new proposal for the
remaining 2 years of this grant
(AFOSR-91-0026).

Therefore, please do not exercise
the 1st option on this grant. Also,
consider the attached cover letter to
be his final report for AFOSR-91-0026.

James R. Stobie
Program Manager



DIRECTORATE OF
LIFE AND ENVIRONMENTAL SCIENCES



Lt. Col. James G. Stobie, USAF
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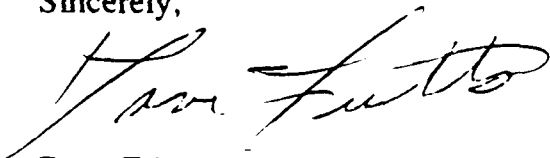
During the first year, we have progressed in both areas defined for study in the original proposal. Collaboration with Dr. Oeyvind Andreassen of the Norwegian Defense Research Establishment (NDRE) initiated a numerical modeling effort which is now providing high-resolution 2-D simulations of compressible nonlinear gravity wave dynamics using a state-of-the-art pseudo-spectral code. We believe these results to be a substantial improvement over previous efforts to address the fundamentals of gravity wave breaking, spectral evolution, and momentum and energy transports in the middle atmosphere. These results have been obtained primarily on a Cray X-MP in Norway to date, but the code is now running on a DECstation 5000 that will go to Colorado with me and on a prototype Giga-flop supercomputer under development by NDRE. We are also in the process of creating a 3-D version of the code for detailed studies of the transition to turbulence and its evolution and effects on heat and constituent transports. The major foci in the remainder of this effort will be the delineation of wave breaking and wave-wave interaction processes, examination of turbulence initiation, evolution, and effects, the validity for turbulent Prandtl number arguments and influences on constituent profiles, and the physics behind the approximately universal saturated spectrum of gravity waves in the middle atmosphere.

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Our efforts in the development of a physically-based parameterization scheme for gravity wave transports and effects are likewise making progress. We have defined the manner in which the observed wave spectrum responds to changes in density, atmospheric stability, and background velocity and designed a procedure for specifying how the spectrum must evolve with height in such a variable environment. Our future efforts will address the incorporation of both zonal and meridional wave propagation, wavefield anisotropy, and geographic variability due to various specified wave sources at lower levels. The prescribed spectral response to a changing environment will permit computation of energy and momentum fluxes and their divergences as well as the effects on the background atmosphere. This parameterization will be tested in a GCM in collaboration with Dr. Norm McFarlane in Toronto and will thereafter be provided to a number of other groups which have expressed interest in the scheme.

I hope this has provided you a useful view of our current efforts and future plans, and I look forward to discussing this work with you at the AMS meeting in Denver this October.

Sincerely,



Dave Fritts

*The letter constitutes an acceptable final report
for the first year of grant AFOSR-71-0026.*

James J. Ehlke